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A MEMBER: In 1907 we took out about 475 valves from 6 inches to 12 inches inclusive, and on repacking lubricated with tallow and graphite. We have examined the valves and the packing occasionally, and it seems to be in apparently as good condition now as it was when the packing was first placed. The valves, most of them, have been operated only at stated intervals when they were opened or closed.

SECRETARY DIVEN: Another question which might come up in this connection is whether the valve as it comes from the factory is packed as it should be with durable packing, or whether the valve should be repacked before putting it in service?

MR. RAYMOND W. PARLIN: While operating a plant in the Middle West it was found necessary to repack practically all of the valves even before they were put in place for the first time, as the water in the system corroded the valve stems, so that, on opening or closing, the packing was cut out and leakage started. In repacking the foreman used a small tight-fitting lead washer, followed by packing made of either lead wool or hemp, lubricated with graphite or graphite and oil, with another small lead washer on top of the whole to keep it in place until the packing nut could be well started. The main dependence was placed upon the graphite in this packing, and the results seemed to be very satisfactory.

The foreman who had had a number of years' experience with this material was of the opinion that no further trouble would be experienced.

OWNERSHIP OF METERS

A general discussion of who should own the water meters, and experience with publicly and privately owned meters. Care of privately owned meters.

MR. GEORGE HOUSTON: On the question of the ownership of meters, in order not to take up any more time than necessary to cover this point as thoroughly as possible in the fewest words, the speaker will read an extract from a paper of his that was read before the Central States Water Works Association at Cleveland in 1911, with reference to the ownership of meters.

Some contend that it is best for the municipality to retain the ownership of meters for the reason that it gives the city full control in the care and inspection of them, which it could not have were they owned by the consumer. We do not agree with those who hold this view, as experience has taught us that it makes no difference whether the city or the individual owns the meter, and, as fully ninety per cent of the meters in use in our city are privately owned, we feel as though we are quite well posted on the question.

When we first began the installation of meters we thought best that the city should own them, but we soon found that people were very careless about protecting them, particularly against frost, and as we were put to a great deal of trouble as well as expense by reason of such carelessness we set about to find some way out of the difficulty. We finally hit upon the plan of giving the individual the privilege of either buying a meter outright, or renting it. If he buys it he gets it at cost, and if he rents it he is charged an annual rental of 25 per cent of the cost of the meter and setting same, but is given credit for 40 per cent of all rents paid, which will pay for a meter in full in ten years. This, as you will probably conclude, is a modest way of forcing the people to own meters, but it has worked out nicely with us.

In handling matters in this way we have never had to make an appropriation for the purchase of meters except the first one of \$4000, as the moneys received from rentals and the sale of meters has enabled us to keep the wheels revolving, and have a supply on hand at all times, and as we buy them only as we need them, they are generally disposed of before the bill comes due.

We have never had any more trouble exercising full control over privately owned meters than we have over those owned by the city, and we find that parties who own their own meters, as a rule, take more pains in the setting and care of them than do those who rent them.

It might be well to state that we do not rent meters that are above 1½ inches in size, but require them to be paid for when installed, and so do not have any large expensive meters on hand.

If conserving the supply of water, by a complete metering of plants, were to be followed out by many of our cities, where a shortage of water now exists, it would be found, as we have found in our case, that they have an abundant supply for all present needs and will have for many years to come.

This paper was written three or four years ago, and the practice mentioned has been followed ever since, and the speaker doubts very much if you could go to our city and by vote of our meter users or water takers have the plan changed now, because they prefer to own their meters, as a rule.

MR. SEABURY G. POLLARD: Who repairs the privately owned meters under those conditions?

MR. GEORGE HOUSTON: The city, charging cost for the parts.

MR. GALLAGHER: Do you charge for the actual cost of repairs in addition? Do you charge for the time of the man making the repairs?

MR. GEORGE HOUSTON: Yes, in some cases.

MR. CHARLES E. McDONALD: Does the cost of repairing the meters become part of the cost of the water bill, or is the owner of the property sent a separate bill for repairing the meter? Does the cost of repairing the meter become part of the main water bill that remains unpaid?

MR. GEORGE HOUSTON: Of course we never file any bills as a lien upon property. If they fail to pay bills on time we shut the water off, and it remains closed off until some one pays the bill. We have had bills of that kind where the water had been shut off for ten years on account of non-payment of bills, and the claim followed the property right down. We have never had any trouble at all. In seventeen years our collections have averaged approximately \$40,000 for water and we have now uncollected less than \$300, \$240 as the speaker remembers it. The delinquent water bills are all collectible and will be paid up in a very short time.

A MEMBER: In that case, suppose a consumer should pay the part of the bill covering the water consumed, and refuse to pay the part of the bill covering the repairing of the meter, would the water be shut off just the same?

MR. GEORGE HOUSTON: Just the same. We refuse to accept any part of the bill unless the whole is paid. We have two methods of collecting for repair of meters. The city does not take off any meters that have been damaged by freezing; they require the property-owner or some one for him, it may be the plumber or any one else, to bring the meter to the office. Our men then repair the meter and we make out a bill and attach it to the meter and some one has to pay that bill before the meter goes out. In that way we have no big account for meter repairs to keep track of. In every case when repairs are made, for cause other than freezing, the meters are put back into service and a report of the time and material is made to the office. We add that to the next outgoing bill

and it has to be paid at the same time the bill for water is paid, regardless of whether the bill is being paid by the renter or by the owner of the property. If the renter pays the meter rental or repair bill, and is under obligation to the owner to pay the water bill only he usually collects or deducts the amount paid for the meter repairs, or rental, or both, as the case may be from the next rental paid for the property; so that in that way it balances up very nicely and makes no trouble to speak of. We certainly have gotten along nicely.

A MEMBER: In your charge do you charge back to the property owner in all cases, or to the consumer?

MR. GEORGE HOUSTON: Everything is charged against the property.

MR. THEODORE A. LEISEN: Do you take similar action in regard to a frozen meter or when it is damaged by hot water?

MR. GEORGE HOUSTON: The same procedure. We do not permit the meter to be taken out of the shop until the bill is paid.

A MEMBER: What is your method of adjusting bills, for the time meters are out for repairs.

MR. GEORGE HOUSTON: We average it.

A MEMBER: Do you average the daily consumption from the time it was put in up to the next regular reading?

MR. GEORGE HOUSTON: As a rule we take the average consumption during two quarters and then we average for two quarters; we take the quarter at the expiration of which the meter was taken to the shop for repairs and the quarter following, that is when it was reinstalled after the repairs.

A MEMBER: The speaker has been in the habit of charging for it during the quarter succeeding when the meter was taken out.

MR. GEORGE HOUSTON: Our ordinance provides that we are to follow the method of taking an average for a charge basis. "Or

other available information." Sometimes we have to deviate from the regular course, but very rarely.

MR. WALTER L. WATSON: Where does the consumer get his meter? Must he buy it from the city or any plumber, does he use his own discretion as to the make of meter?

MR. GEORGE HOUSTON: The city reserves the right to furnish the meters; they have to get them from the city from the smallest up to the largest size. We have for a good many years had three different kinds of meters from which they can make selections; so that not any one single kind is adopted as the standard meter or the one that they have to take.

MR. PATRICK GEAR: Would the last speaker state if when he has a meter that has been running along four or five years he then takes it out and inspects it.

MR. GEORGE HOUSTON: Once in a while we do but, not as long as the bills are running along in about the same ratio. If indicated consumption starts to go down when a party has been constantly quite a heavy consumer, we have the meter inspected to determine the cause, if possible.

MR. PATRICK GEAR: The speaker would like to know how you get around a case like this. Suppose we installed a meter in a building, which was occupied by the owner himself, his wife and a maid, and after this meter was put in it registered about 30 gallons per day per capita. During the summer months in the lawn sprinkling time, the meter registered 450 gallons per day per capita, and then the consumer would claim that there was something the matter with the meter. After a few years of service this same meter would come down to a basis where it would run about 75 gallons per day per capita and the consumer would claim that the meter was all right. But if you would look and see the condition of his lawn, you would surely say that the lawn was very fine, and the meter was no good. Of course we all know that every one likes to praise their own method. If a city or town rules that the consumer must buy his own meter, and those meters are sold at different prices, there is not any doubt that he will buy the cheapest meter, although

it may not be the best one. You will have a lot of trouble in keeping tabs on cheap meters, seeing whether or not they are doing the work laid out for them, and finding out if they come up to the standard. Any meter that has been working regularly for five or six years, should be taken out and tested.

In our city the manufacturing plants run pumps and when these pumps get out of order, the meters installed there must do all the work. In some of the plants the meter will register 200,000 cubic feet for one month and the following month may run 60 cubic feet, which would indicate that the meter was stopped. When we send out the bill to them estimating it on a six-months' basis, the manufacturer will come in and say that he did not use the amount charged for, and rather than have any trouble with him we cut it down some.

If the consumer owns the meter he may take it out when he pleases, but if you should want to take it out for a test, he would tell you very quickly that the meter belonged to him and that you had no right to touch it. Then all your troubles would start.

MR. FRANCIS C. HERSEY, JR.: In regard to the first part of this question as to whether the city shall own the meter, we could find out very quickly the situation in the places represented by officials here by asking first of all those who live in places where the meters are owned by the water works to stand up, and then ask all those who live in places where the consumer owns the meter; and this vote might shed some light on the question.

(Vote not taken.—EDITOR.)

MR. W. E. HASELTINE: That might be all right if we all approved of the method that we ourselves are using. In our case the consumers own the meters, but the speaker does not believe it the proper system.

MR. GEORGE HOUSTON: Mr. Gear ought to have entered the profession of the law rather than the business of managing a water plant, for he certainly would have made a very good lawyer. He asks questions in rapid succession and then he suggests the answers and draws the conclusion himself, that the only way for a city or corporation to have any control over their meters, without getting into a row with the man's wife or the man himself, is to let the

municipality or the corporation own them. Now the speaker stands here to say to you that a whole lot of the trouble that every water works man has is due largely to his own personality. If you do not believe in your own system, if you do not believe it is right, you certainly will have a hard job convincing the people that it is right; but if you are soul and body given over to the idea that you are right and what you are advocating is right, you will not have any trouble in convincing the people. We probably have less trouble in Kalamazoo over our right to take off a meter and look after it than is had in any city in the country, whether the meters are owned by the municipality or a private company, or by the individual. We simply give them the right to pay for the meter if they want to or else pay a rental to the city for the meter; but we control it just as much as if it was owned by the city itself. We certainly have less trouble along the line of getting the consumers themselves interested in the meter than we would have if they did not own it. It does not make any difference whether a large majority of the people here at this meeting live in cities where the meter is owned by the municipality or the corporation, or whether they live in cities where the majority of the meters are owned by the individuals; that does not make any difference as to the right of the question. As said in the speaker's first talk, it depends upon the individuality of the man whether he has trouble or whether he does not. The last gentleman that spoke said that in his city the meters were owned by the consumers, but he did not believe in it. He will have a hard time, the speaker will guarantee, in getting meters out of a man's place unless the city owns them, when he wants to inspect the meter.

MR. W. A. PATTON: If we were all situated as favorably as our friend in Kalamazoo, where they raise so much celery that all his patrons have their nerves quieted in advance, we might find that under those conditions we would be able to take out an under registering meter without a fight. But down our way we would have a law suit at the drop of the hat if we were to try it. The speaker therefore thinks it better for the company to own the meter, for then we can take out our own property without trouble.

MR. W. E. HASELTINE: In Wisconsin we are controlled by the railroad commission, which is a big commission and an extremely

good one. We are also interested in gas and electric property. We own our gas and electric meters. We would not allow consumers to own them if we could help it. We want to own the meters ourselves. It is much more satisfactory in the case of gas and electric companies and the speaker does not see why it should not be equally so with water meters.

MR. C. W. WILES: We have about 90 per cent of our meters owned by the company and 10 per cent owned by individuals. The speaker is free to say that he does not know whether we could stop them from buying meters or not; but has not tried to very much. If a man wanted to own his own meter the speaker has said, "All right," but he does believe in the ownership of the meters by the company; for this reason, if you have a meter that has been running along five or six years and you go over your books and find that the meter has been dropping behind, that meter ought to come out. We took out over forty this spring, because we thought they had been running longer than they ought to run correctly.

We found that 75 or 80 per cent of those meters had been running slow, so we took them out without asking anybody's permission. We simply recorded on our books that the meter had been changed and another meter put in. We did not go to the owner of the property about it and say, "We are going to take this meter out;" we simply go and take it out and put another in its place. If you were to take the meter out without putting another in its place you would have to estimate the consumption until such time as you did place another meter. One advantage of the company owning the meter is that there is no controversy over its ownership. If the customer owns the meter and it freezes you will have trouble when you go to take the meter out and average the water that is used while it is out. If you own the meter you do not have any trouble.

MR. GEORGE HOUSTON: Why don't you repair it in the first place? How many did you send back to the factory?

MR. C. W. WILES: We sent back fifty of them last year.

MR. GEORGE HOUSTON: Then your repair shop is not what it ought to be.

MR. C. W. WILES: We cannot repair a badly sprung brass meter, we have no appliances for bringing such a meter back to place. Most of those that we have had to send back have been large size meters. We find that it is much more convenient to take the meter out and put another in its place and then repair the one taken out when we get ready.

MR. GEORGE HOUSTON: Mr. Gear said that if the consumer paid for his own meter he would always select a cheap meter in preference to a better grade. We have meters that we sell for \$6.75, \$7.00, \$7.50, and \$8.75 for the $\frac{5}{8}$ inch size. Since the 17th of last June we have put in approximately 500 meters on lines where the people bought them. There has been but one of the \$7 meters put out, and about three of the \$6.75 meters, and they were put on places that the Board of Health had ordered connected with sewers, and insisted that a water supply be carried in. The properties in two of these cases had been taken over by foreclosure of mortgages, and were owned by men who lived east and they wanted the cheapest meters they could get. It is *not* true that the Kalamazoo people buy the cheapest, even if they do eat a lot of celery.

MR. HENRY P. BOHMANN: Milwaukee has about 161,000 meters in service, all of which are owned by the consumer. The speaker wishes to go on record that meters should be owned by the city. Our experience has proved that to be the correct position.

The Railroad Commission of Wisconsin has in every instance ruled that the utility must furnish the meter, and a special ruling was necessary for Milwaukee, for the reason that we would have been obliged to purchase a lot of old junk in order to get possession of the privately owned meters. The water department started out correctly. Mr. Benzenberg, city engineer, at that time, had charge of the water department, and selected what he considered the best meter. Several aldermen who happened to be plumbers were anxious to get the agency of different meters, and finally succeeded in getting a resolution through the common council compelling the consumer to furnish the meter. As the result of their activities we now have about thirty-five different makes of meters in service, good, bad and indifferent; whereas if the department owned and had the selection of the meters we would have confined ourselves to about two or three good types. The meters are furnished by the

plumbers, who charge anywhere from \$10 to \$20, whereas if the department owned the meter we would buy in large quantities and would furnish them for \$5 or \$6. Indirectly that would be of benefit to every consumer. We have thirty-five meter readers who read the meters monthly and report as to how they are registering. If they are not registering properly the next step is to take out the meter, send a written notice to the consumer, and ask him to sign the notice to have the meter repaired. The party has ten days to sign and send in that notice. If he happens to be a tenant it usually requires ten days before the notice comes in. In the meantime the meter is waiting in the shop. After the expiration of ten days it is repaired, and then it necessitates a second trip to replace that identical meter. In the meantime the water registrar is advised that the meter has been taken off temporarily and replaced, and then the account is averaged. This is a simple proposition in the ordinary residence; but out of our total revenue one-half is paid by one hundred large consumers. We have a number of them that are paying from \$20,000 to \$25,000 annually. It is very difficult to find a proper way or method of averaging the account when the customer is using from \$25,000 to \$75,000 worth of water a year. We notice that whenever a meter is taken off it is always claimed to be during the dullest season. The fact that gas and electric utilities furnish the meters is pretty good evidence that the water departments and companies should follow suit.

MR. GEORGE HOUSTON: Did you ever have or hear of meters that were owned by the city, those large meters, that would stop and would necessitate averaging the account?

MR. HENRY P. BOHMANN: No, the department keeps a sufficient number of meters on hand, so that when a meter drops in registration and we have to repair it, we take off the defective meter and immediately replace it with another meter, then the defective meter is brought into the shop and put in shape. Under our present conditions we have to replace that identical meter.

In case of meter repairs, we charge only the actual cost of repair, of which we keep a record of each particular job; then we charge the overhead expense. A meter repair job is like a doctor's bill, it comes unexpectedly; it is always unsatisfactory. We are spending something like \$60,000 on meter repairs yearly. The speaker

has a meter in his house that has never cost one cent for repairs. He would be willing to assign the ownership of that meter to the city with the understanding that they would replace it every time it needs repair; and does not see why every property-owner cannot assume the same position.

MR. H. B. MORGAN: The question of who should own the meter—the water department or the consumer, is probably troubling most of us. The speaker's experience is that the meter should be owned by the water department, for the reason that we then would have full control of it, and, if for any reason it became necessary to remove a meter and put another one in its place, we would not be compelled to argue with the consumer as to its condition, as in a great many cases you would have to do if he owned the meter, and in nine cases out of every ten you would utterly fail to convince him that his meter was not correctly registering the water passing through it.

At one time some of our consumers owned their meters and we always experienced a great deal of trouble whenever it became necessary to remove one for repair or to put another in its place.

In one particular case where the then manager of our company was discussing with the consumer the condition of his meter and the necessity of removing it for repair, he told the consumer how hard water acted on the brass in the meter and caused the meter to slow up and in many cases to absolutely stop. The consumer said to him, "Well, if your water has that effect on brass, what effect will it have on my stomach?" The manager was stumped for a second and then replied, "Well, your brass is not in your stomach."

Mr. Chairman, the speaker did not expect to enter into this discussion, but finds that he will have to keep out of this convention if he wants to keep out of discussions.

MR. WALTER L. WATSON: Somebody has well said that the consumer should not be expected to pay for the meter that measures water any more than as a patron of a grocery store he would be expected to pay for the scales that weigh the sugar.

MR. PATRICK GEAR: The speaker finds great pleasure in sitting down with his friend from Kalamazoo, and talking about the water department of that place. His department is something like ours

was some years ago. An old man who came to work for the department from its foundation was working in the street one day when a traveling man stepped up to him and said,

"Is this a municipal department, or a private corporation?"
"No, it belongs to John O'Brien and Mr. Hardy."

Now it would seem that it is the same in Kalamazoo and whatever this friend says is law in his town.

Mr. Kirkpatrick, who was the former superintendent and who is now manager of the City Gas and Electric Department, wanted to buy the 6-inch meter installed at his plant, but our department would not sell it. If we did sell it we would lose the \$60 per year rental charge.

SECRETARY DIVEN: Does the \$60 rental pay for any water?

MR. PATRICK GEAR: That is for rental on the meter. He used a large amount of water on the Fourth of July, so that we will get \$5 for the water used and \$60 for the meter.

From two concerns that we charge \$40 rental on a 4-inch meter, we receive about \$10 for the water used. You can see that if they owned the meter we would lose the rental charge.

It seems in this convention that it is very much the same as what General Hancock said when he was running for President, in the year 1880; he said that the tariff was a "local issue." The meter question is a local issue, and must be handled according to the conditions existing in the different cities and towns. Everybody thinks that his own department is all right. The speaker never had any trouble with the people in Holyoke, but was afraid that our friend from Kalamazoo may have in his town, and wanted to advise him to come over on the popular side of municipal ownership of meters.

MR. E. E. DAVIS: Probably the experience of my town dates back with regard to meters farther than that of any city in the United States outside of New York. The first meter that ever came to Richmond was made in 1858, and was a 1-inch meter and weighed 500 pounds. It was too "bunglesome" and too heavy. It was tried for a while but never was satisfactory. In 1874 Mr. John Kelly came to Richmond and the superintendent of the water works gave him an order for four meters. The speaker was the plumber

for the department at that time and his duties being almost anything from superintendent down to plumber, he put the meters in that we bought from Mr. Kelly and used them to test for waste. We also bought a $\frac{3}{4}$ -inch Hartford meter put it on a livery stable where the man was paying under the ordinance \$65, and the meter reading at the rate of 25 cents per 1000 gallons made his bill run up to \$125. So then we started to convince the city council that there was a great deal of waste; but they would not be convinced. In 1888 the city set aside \$1000 from its construction account for meters, giving them to parties that asked for them, and charging them \$2 a year for the use of the meter and 25 cents per 1000 gallons for the water. The large factories began to see where they could save money provided that the city would reduce the rate, and they put in their own meters. We were charging \$2 a year for rent of meters, but the city attorney decided that we could not collect that because we charged in advance; so the \$2 rent was taken off and the parties that got meters from the city paid the regular straight rate.

A good many years after that our pumpage rose to a tremendously high figure while the pressure was going down. The speaker made numerous tests to demonstrate to council that waste was going on and that meters should be adopted; but they decided then that they would not take any action but would allow the people to purchase their own meters, and a great many people bought meters. The lowest bill that any of them had was \$3.38 a quarter ordinance rate. We charged by the month, and the majority of the bills were reduced to 65 to 75 cents a month, through meters. One man paid \$1.68 a year for water through his meter. An old man on a side street, that ran a shoe shining place, did not get any reading from his meter and he paid 38 cents for the entire year. We finally got the city council interested in the idea that waste was going on, and they voted us \$15,000 to purchase meters. We put the meters on, and charged a flat rate of 15 cents per 1000 gallons. Everybody was working then for the meters. The question arose as to the meters purchased in between the time that we originally purchased when we paid \$13 a piece for them as to whether a cheaper meter would be acceptable to the city. That was in the days before the disc meters were invented. After the disc meter came in we stopped buying them for the consumer and let the consumer buy for himself. The city would put in the meter, and then the question would

come up as to who was to pay for it. That question has been up since 1885, but never decided.

We have tried every way in the world to find out which is the best way of controlling the meter? The city puts in the connection between the street and the property, but the plumber furnishes the lead pipe to make that connection. We furnish the meter and put it at the curbstone. We charge them a minimum rate of not less than \$8 a year. If a consumer wants a meter put in for his premises larger than 1-inch he pays the cost not only of the meter but the connections, outside of the labor. The fire underwriters and insurance people have all been jumping on the speaker because he has positively declined to allow an insurance connection larger than 6-inch for fire protection.

Another question that has come up about meters is as to who shall keep them in repair. The city of Richmond keeps all meters in repair up to 2-inch. If a meter larger than 2-inch is found not working due to wear the necessary parts are ordered from the factory and the bill is sent to the consumer. If a consumer has two connections in his house the city furnishes him one meter, and he buys the other. He does not know what kind of a meter he buys because the agents in Richmond all charge you the same for all kind, \$8.40 for $\frac{5}{8}$ -inch meters.

Municipalities that own their water works should own the meters, because then there is no question about the repairs or anything else. We put meters on to prevent waste; the city of Richmond has saved nearly a half million dollars for a reason that all of you gentlemen are familiar with. If you are going to furnish water at flat rates with no restriction except individual inspection you will make a serious mistake, for meters are inspectors in themselves and always on the job.

If a meter stops we average the bill, and settle on a basis of the average for the preceding six months; or if the consumer objects to that method we will let the meter run for thirty days and make the average in accordance therewith.

We endeavor to keep the meters in the best condition that we can. Sometimes they can be repaired right at the customer's premises; at other times it is necessary to send them to the shop.

Having had experience with meters since 1874 the speaker thinks it is best for the municipality to own the meter; or if it is a private meter the city should control it and keep it in repair.